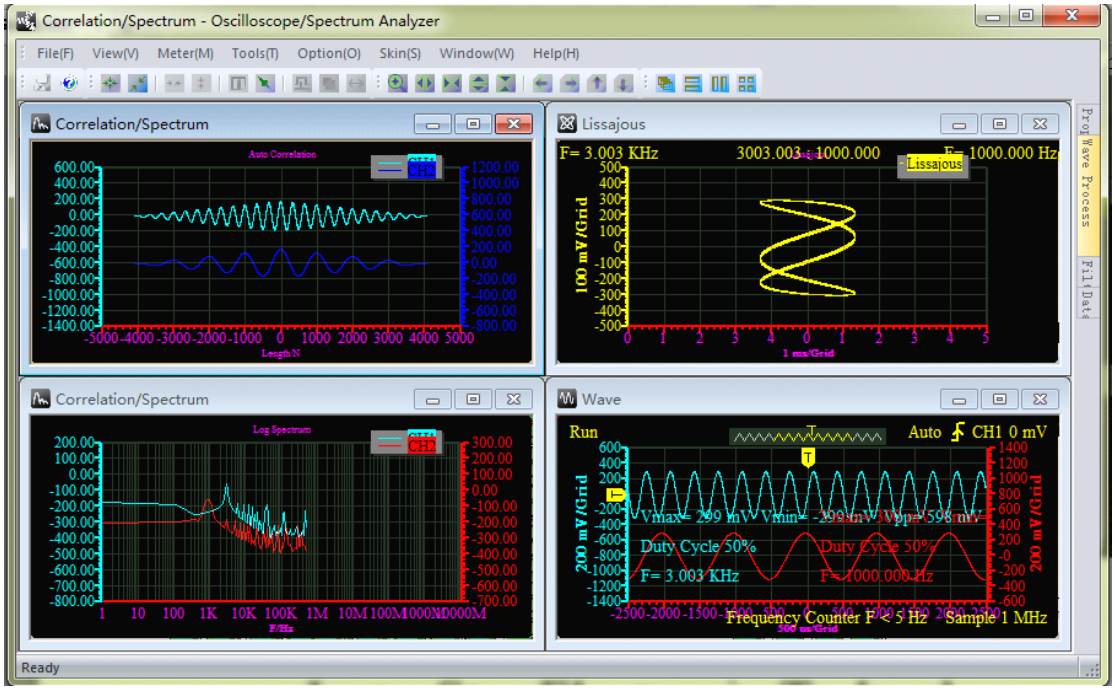
Multi VirAnalyzer

DDSO-100/HDSO-100 Model User Guide



InstruStar Electronic Technology

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contents

PC SYSTEM REQUIREMENTS

- Windows XP，Windows 7
- Pentium or higer processor
- USB2.0 High speed port.
- 32MB RAM
- 125MB hard disk space

1.Introduction

DDSO-100/HDSO-100 dual-channel digital oscilloscope, with "low-cost, high-performance" as the design goals. well-designed bandwidth of 40M, 100M sampling rate, 2 channels, alternating support X, Y and XY alternating pattern of two-channel virtual oscilloscope, spectrum analyzer . Meanwhile, DDSO-100 device has a the DDS function, supports five kinds of waveform output. Sine wave can output up to 20M. The device communicate with the PC via high speed USB2.0.

2.Feature Description

Digital oscilloscope	
Channels	2
Impedance	1MΩ 25pF
Coupling	DC
Vertical resolution	8Bit
Gain range	10mV-12V（probe X1）
DC accuracy	±3%
Timebase range	1ns-20s
Input Protection	Diode，120Vpk
Autoset	Yes(1Hz to 40MHz)
Trigger Mode	Auto、Normal and Signal
Trigger Type	No、Rising edge、Falling edge and edge
Trigger level	Yes
Trigger Source	CH1, CH2
Buffer Size	1KB-256KB/CH
Bandwidth	DC to 40MHz
Max sample	100MS/s
Vertical mode	CH1, CH2, ADD, SUB, MUL
Display Mode	X、Y-T 和 X-Y
measurements	Yes
Wave save	Osc(Private)、Excel and Bmp

Spectrum analyzers	
Channels	2
Bandwidth	40MHz
Algorithm	FFT(18 windows)、correlation、power spectrum

FFT points	8-1048576/CHN
Filter processing	FIR filter supports arbitrary range of frequency sampling method , and Rectangle, bartlett, triangular, cosine, hanning, bartlett_hanning, hamming, blackman, blackman_Harris, tukey, Nuttall, FlatTop, Bohman, Parzen, Lanczos, kaiser, gaussand dolph_chebyshev, window method design. IIR filter support "Butterworth", "Chebyshev I", "Chebyshev II", "Elliptic" type of filter design

DDS(Only DDSO-100)	
Wave	Sine, Square（Duty circle variable）, Trianglar
Amplitude	≥9Vp-p(no load)
Impedance	200Ω±10%
Offset	±2.5V
Frequency range	1Hz ~ 20MHz(Sine), 1Hz ~ 2MHz(Others)
Frequency resolution	1Hz
Frequency steadiness	$\pm 1\times10^{-3}$
Frequency precision	$\pm 5\times10^{-3}$
Triangular wave linearity	≥98%　(1Hz~10kHz)
Sine wave distortion	≤0.8%　(1kHz)
Square wave rising/falling time	≤100ns
Square wave duty circle	1%~99%
SWEEP	
Sweep range	Fs 到 Fe
Sweep time range	0.1 ~10 s
Amplitude	0.5Vp-p ~ 10Vp-p

Note: The oscilloscope factory calibration, if you are not satisfied with the measurements, canmanual calibration, the specific reference oscilloscope instructions.

3.Software Installation

1.1 Installation package

Install software package. The package will install the software and drivers.

1.2 Hardware connection

The USB and computer connections, pop-up shown the interface, select "Install the software automatically";

If the installation is successful, the following pop-up interface.

Note:

1、If driver installation fails, please manually install the driver. Drive directory in the installation directory ". \ Driver \ MDSO" inside.

2、If you manually install the driver fails, see the directory ".\user guide ","MDSO MDSO-LA HDSO DDSO-100 solution".

Figure 4.1 mouse opetation

4.Basic operation

Software support Mouse Drag、Mouse Measure、Area Select、Sample Points、Horizontal Zoom、Horizontal Move、Vertical Zoom、Vertical Move and Area Zoom operation，easy and convenient to view information and analysis.

4.1 Mouse Drag

Figure 4.1,The first icon "mouse drag", click on the icon to start a mouse drag function, as long as the drawing area, press the left mouse button and move the mouse, while drawing the curve can be moved.

4.2 Mouse Measure

Figure 4.1,the second icon "mouse tracking", click on the icon to start trackingthe mouse, as long as you want to track the curve, press the left mouse button, the system will correspond to the points of horizontal and vertical coordinates, displayed on the lower left corner . (Figure 4.2).

Measuring line, divided into two states, "selected" and "non-selected". Selected, scroll the

mouse wheel to fine-tune the measuring line; non-selected, scroll wheel, zoom waveform.

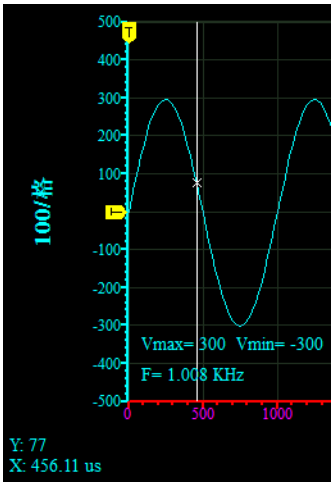

Figure 4.2 mouse measure

Figure 4.1,the third icon "mouse X-axis measurement", click on the icon to start the mouse X-axis measurement. Click in the waveform interface points to measure the level ofthe middle, the system will be measured, the curve corresponding to the mouse click position and display the corresponding left and right level of difference (Figure 4.3).

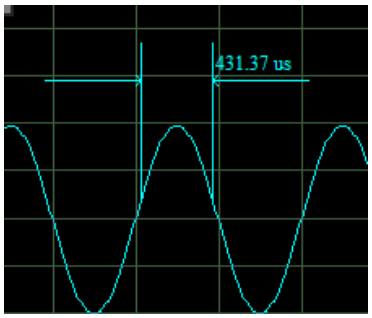

Figure 4.3 mouse X-axis measurement

Figure 4.1,The fourth icon "mouse Y-axis measurement", click on the icon to start the mouseY-axis measurements. Click in the waveform to measure the interface of the two peaks of the vertical center, the system will be measured, corresponding to the mouse click position the top and bottom curve, and shows the corresponding vertical difference (Figure 4.4).

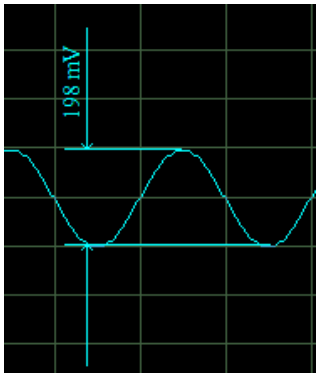

Figure 4.4 mouse Y-axis measurement

Figure 4.1,The fifth icon "mouse measurement", click on the icon to start the mouse

measurement. Click in the waveform to be measured interface position curve, and then move the mouse. System will measure the two-point difference between thehorizontal and vertical (Figure 4.5).

Measuring line, divided into two states, "selected" and "non-selected". Selected, scroll the mouse wheel to fine-tune the measuring line; non-selected, scroll wheel, zoom waveform.

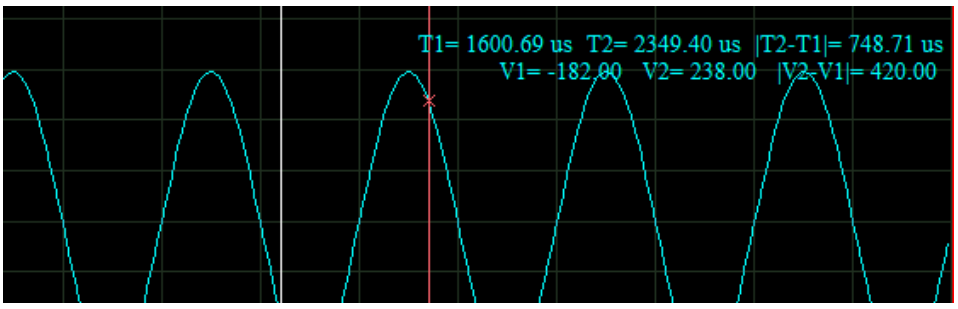

Figure 4.5 mouse measurement

4.3 Samples Points

Figure 4.1, the seventh icon "sampling points", click on the icon to start sampling point display. Activate the feature, when the amplification is large enough, you can increase the sampling point display.

4.4 Horizontal Zoom

When moving the mouse into the drawing area, scroll the mouse wheel, the horizontal axis, they are just like a real instrument, to 1us, 2us, 5us, 10us, 20us, 50us, 100us, 200us, 500us, 1ms, 2ms, 5ms, 10ms , 20ms, 50ms, 100ms, 200ms, 500ms, 1s, 2s, 5s, 10s to change the step value, while the curve will be scaling .

4.5 Horizontal Move

When the mouse is a small hand (drag state), press the left mouse button, then move the mouse, the curve will move with it.

4.6 Horizontal Fine Tuning

Sometimes the need is not like 4.4 and 4.5, as according to the coordinates to movethe curve, this time with shortcut keys "←" and "→" to move left and right curves.

4.7 Vertical Zoom

When the mouse moves to the left or right Y-axis. Will display a translucent upper and lower arrows, while the mouse into a small hand shape. At this point, scroll wheel, left and right Y-axis corresponds to the curve (left Y-axis corresponding to the CH1, the right Y-axis corresponds to CH2), the vertical scale.

4.8 Vertical Move

When the mouse moves to the left or right Y-axis. Will display a translucent upper and lower arrows, while the mouse into a small hand shape. At this point, left mouse button, move the mouse, the curve will move up and down with the mouse. You can use the shortcut key "↓" and "↑" to achieve the left Y-axis move up and down the curve, and the use of Shift + "↓" and Shift + "↑" to achieve the right Y-axis move up and down the curve.

4.9Aera Zoom

Figure 3.1, the sixth icon "area select" start area, select the function, press the left mouse button and drag, you can choose what you want to enlarge the area, then choose the area will

change color. After selection, right-click menu or toolbar area enlarge, they can choose the part magnified.

5.Oscilloscope / Spectrum analyzer

USB connected to the computer, the software will automatically detect and establish a connection with hardware. The right side of the digital storage oscilloscopes workspace "property set" of the top will be a DDSO2.0 (N)/HDSO3.0(N) of the drop-down option, N will be different with different computers, the same used to distinguish between multiple devices. Select this option to pop-up interface in Figure 5.1.

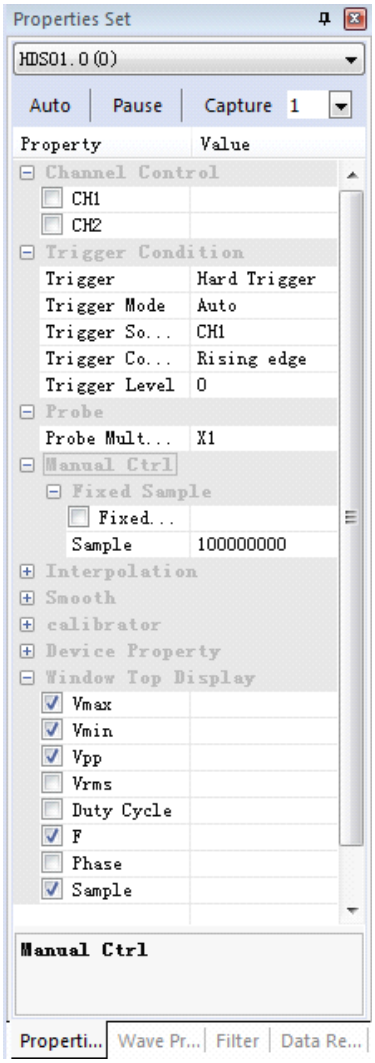

Figure 5.1 property set

5.1 Basic control

5.1.1 Channel Control

"CH1" and "CH2" is used to start and shut down the corresponding oscilloscope channel.

5.1.2 Auto and Pause

"Auto" to turn on automatic detection of the oscilloscope; "pause" the data collected can be suspended.

5.1.3 Capture frame

"Capture" button, click it to start capturing the frame; Drop-down box to select consecutive frames capture frame, which can be from 1 to100.

After capture, you can "data record" tab inside, find the time to date txt text file named, for example, 10-5 +14-13-2 +1. txt that this is at 14:00 on October 5 13 minutes, 2 seconds grab the first frame of data. Just double-click or right-click "Import Analysis" will be able to load the data analysis.

5.1.4 Trigger conditions

The conditions used to detect specific signal acquisition.

5.1.5 Fixed sample

For some specific requirements, you can use a fixed sampling rate feature, select the sampling rate, click on the "fixed sampling rate" check box, it starts a fixed sampling rate.

5.1.7 Probe

When you change the oscilloscope probe above × 1, × 10, the interface needs to select the appropriate probe multiples, so that we can correct the reality of the waveform peak.

5.1.8 Interpolation

Support automatic and manual interpolation, after selection will be based on a given frequency interpolation, the frequency of the waveform when the acquisition is greater than the frequency interpolation, the system will start the interpolation function.

5.1.9 Calibration

As the computer USB power supply voltage is different, so the factory calibration of the offset may have to recalibrate it. The measured waveform of the bias and the biasinput signal source, enter "offset calibration (mV)" there can be.

Factory when there may be slight amplification bias can be adjusted by the amplitude

calibration.

5.2 Waveform analysis

5.2.1 Views Management

Figure 5.2, click the "View" button, a view of the build menu will pop up. Select the appropriate menu item, you can create a new view, for the analysis of the waveform display.

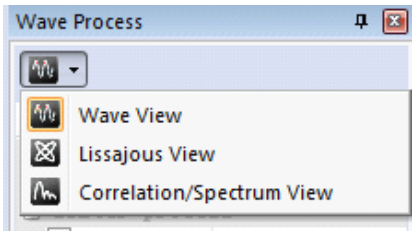

Figure 5.2 views mange

The "Waveform View" is mainly used for the input waveform, the waveform synthesis, and their filtered waveform display; "Lissajous View" is mainly used for display two channels of frequency ratio generated Lissajous graphics; "correlation / spectrum view "mainly used for analysis, and filtering directly after the input waveformof the Amplitude, phase, logarithmic Amplitude, self-power spectrum, self-power spectrum of the number, self-related and cross-correlation.

"Waveform View", "Lissajous View" and "correlation/ spectrum view" view analysis of property, select the appropriate view, the corresponding "wave processing" properties window will display the corresponding view of the analysis of properties.

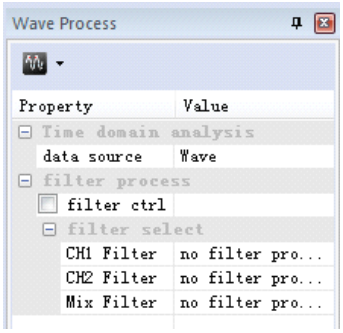

Figure 5.3 Wave view

5.2.2 Wave view

Select any of the "wave view", the "waveform process" attribute which will display the contents of Figure 5.3.

5.2.2.1 Time-domain analysis

"Data Source" to select the displayed waveform view, can be "Wave", "wave add", "Wave Sub(CH1-CH2)", "Wave Sub(CH2-CH1)" and "Wave Mult".

5.2.2.2 Filtering

"Filter Control" is used to enable / disable the filtering function.

"Filter selection" is used to select the filter to using filtering fo CH1, CH2 and Mix wave, which is designed by QFilter software.

5.2.3 correlation/ spectrum view

Select any of the "correlation/ spectrum view", the "waveform process" attribute will display the contents of Figure 5.4.

5.2.3.1 Hor-Axis Log coordinate system

"Hor-Axis Log coordinate system" is used to control the X-axis is logarithmic coordinate system to display.

5.2.3.2 Time-domain analysis

"Data Source" to select the displayed waveform view, can be "Wave", "wave add", "Wave Sub(CH1-CH2)", "Wave Sub(CH2-CH1)" and "Wave Mult".

5.2.3.3 correlation/ spectrum analysis

"Analysis Type" is used to select the features to

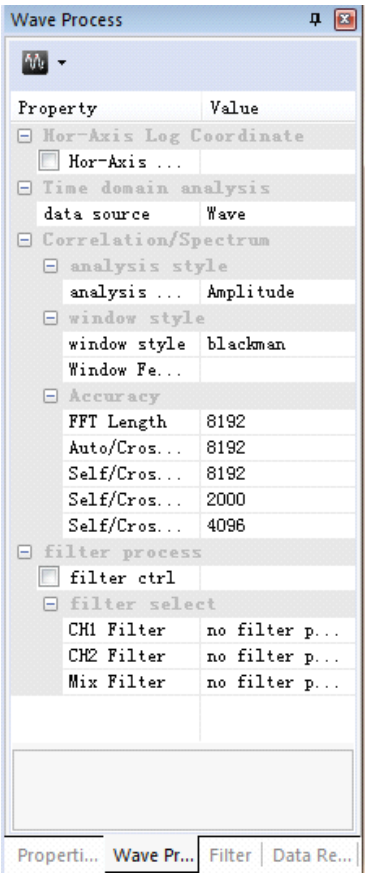

Figure 5.4 correlation/ spectrum view

analyze, can be "Amplitude", "phase", "log Amplitude", "self-power spectrum", "log self-power spectrum" ,"cross-power spectrum", "log cross-power spectrum" ,"auto-correlation" and "cross-correlation ".

"window type" is used to select the signal window, can be "rectangular window", "triangular window", "Hanning window", "Hamming window", "Blackman window" and so on.

"Accuracy" is used to set the analysis accuracy.

5.2.3.4 Filtering

"Filter Control" is used to enable / disable the filtering function.

"Filter selection" is used to select the filter to using filtering fo CH1, CH2 and Mix wave, which is designed by QFilter software.

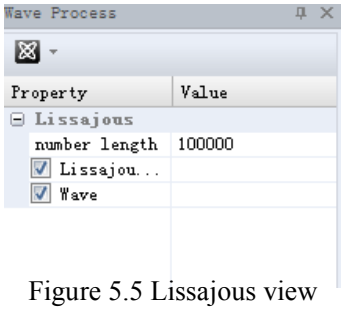

Figure 5.5 Lissajous view

5.2.4 Alternating X and X-Y (Lissajous)

Select any of the "Lissajous view", the "wave process" attribute which will display the contents of Figure 5.5.

5.2.4.1 Lissajous

"Data length", used to set the length of the data to draw Lissajous.

Check box "Lissajous wave" is used to set whether to draw Lissajous graphics;

Check box "wave" is used to set whether to draw X alternating wave.

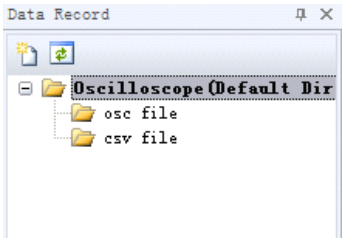

Figure 5.6 data record

5.3 File operations

The saved file can be find in the "data record" tab, as shown in Figure 5.6.

5.3.1 Capturing frame file

capture frames in the file access, can be found here. Double-click the file as long as you can reload, view waveforms and analysis.

5.3.2 Waveform storage

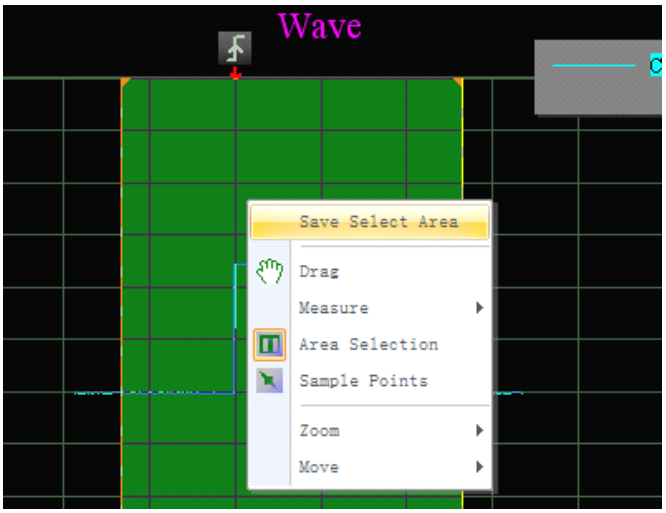

Figure 5.6 area save

Oscilloscope to capture waveforms, with the area selection tool, select the save area, then right click mouse, "to save the

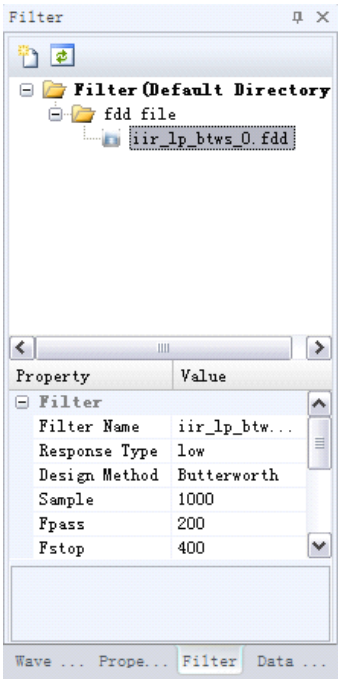

Figure 5.7 filter files

selected area", you can save for the waveform.

5.3.3 Filter Files

Start "digital storage oscilloscope," after the right side of the workspace, select the bottom of the "filter" filter will open the corresponding document management properties. Click on any files, it will pop up a properties box below, shows the properties of the corresponding filter.

6.Filter Design(QFilter)

In the system tray menu, select "Filter Design (QFilter)", will start the filter designsoftware, started the interface shown in Figure 6.1.

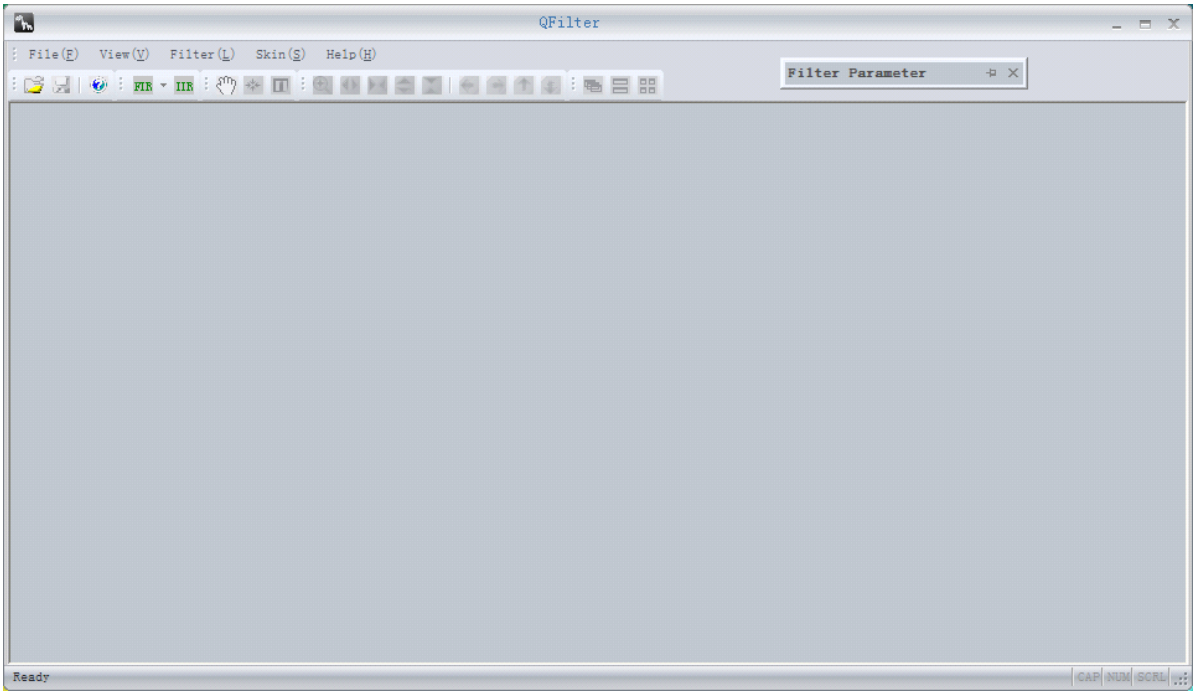

Figure 6.1 QFilter interface

6.1 FIR filter design - window method

Click the toolbar "FIR" button in the pop-up menu, select "Window method", will pop up a dialog box in the dialog box, fill in the desired design of the filter types and their parameters. When choosing and click "design" will appear corresponding to the filter "amplitude(dB)", "amplitude", "phase", "log Amplitude","step response", "zero-pole" and "group delay" seven images. Figure 6.2 for the FIR hanning window length of 74 design results map.

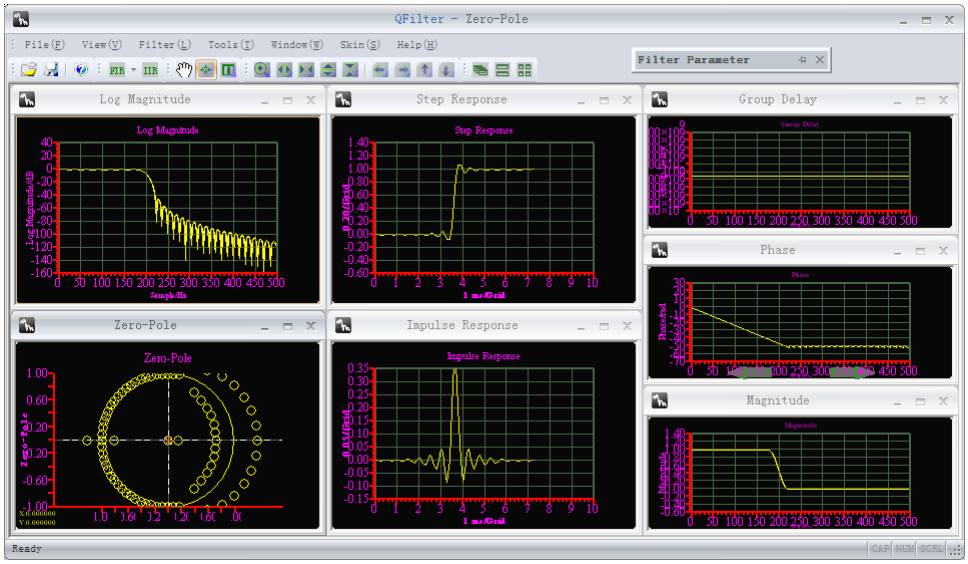

Figure 6.2 FIR hanning window length 74

6.2 FIR filter design - frequency sampling method

Click the toolbar "FIR" button, in the pop-up menu select "frequency sampling", will pop up a dialog box, shown in Figure 6.3.

Respectively, according to need to fill the order, the normalized frequency and the corresponding point of the range, plus choosing the type of window, and then click Design. Design was completed and results will appear curve. Design is complete,click OK, there will be corresponding to the filter "amplitude(dB)", "amplitude", "phase", "log Amplitude","step response", "zero-pole" and "group delay" seven images. Figure 6.4 is the design of FIR frequency sampling results of Fig.

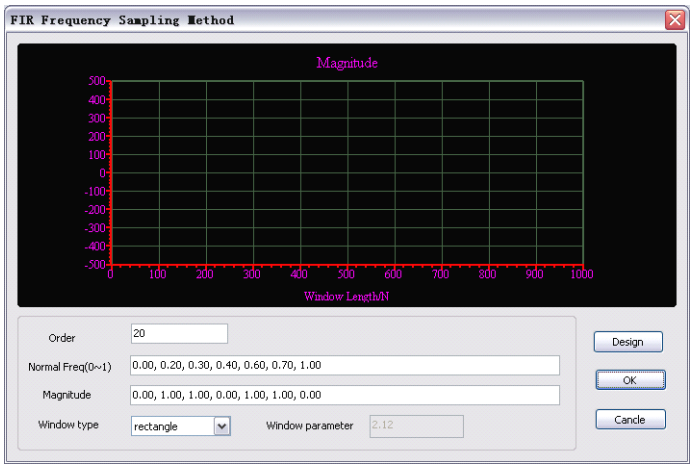

Figure 6.3 frequency sample design interface

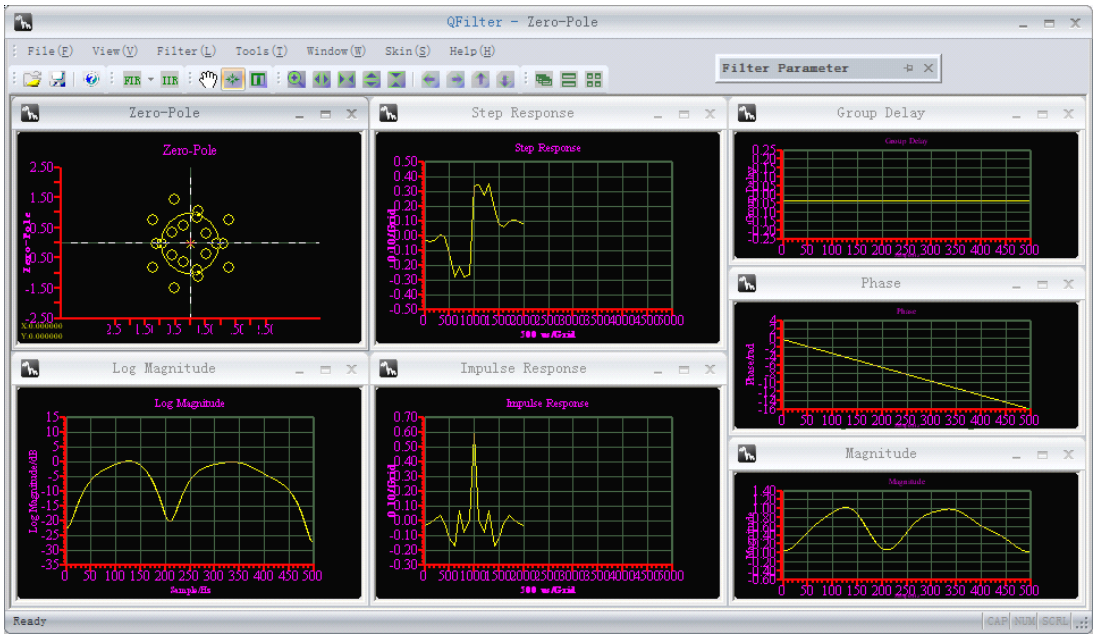

Figure 6.4 FIR frequency sample

6.3 IIR filter design

Click on the toolbar "IIR" button will pop up a dialog box in the dialog box, fill in the desired design of the filter types and their parameters. And FIR as fill parameters each time, and move the mouse, the software will be completed to determine the parameters are correct, if there is an error, the bottom of the dialog box will display, where the parameter is incorrect; when all parameters are right after the "order of the budget" will be given in the design of indicators to meet the kind of order of the filter.

Of course, you can also to choose the filter type, can be "Butterworth", "Chebyshev I", "Chebyshev II" and "ellipse" and its order number. When choosing and click "design"will appear corresponding to the filter "amplitude(dB)", "amplitude", "phase", "log Amplitude","step response", "zero-pole" and "group delay" seven images. Figure 6.5 is 7 order IIR elliptical design result.

6.4 data and bmp save

When designing a good filter, you can save the data and images. Click on the toolbar or menu item "Save" dialog box will pop up to save, in the "Save as type" drop-down combo box, select the corresponding txt, fdd would be able to filter H (z) coefficients stored, select the bmp they can save the images (Figure 6.6).

For txt format, in the dialog box below, "the output coefficient formatting", you can specify to save H (z) or pole-zero; can specify the output of H (z) pole-zero coefficients and in what kind of format, you can also choose whether the parameters and then multiplied by a factor of the output. For example: Select% 0.0f, and multiplied by the factor given is 4096, then the output will be multiplied by the coefficient will be designed after the integer part of 4096, there is no fractional part.

For fdd format, the filter can be designed for each parameter are preserved for future to open or for a given waveform filtering.

For the bmp format, you can "bmp save" and select "Save all images" check box, so one will be able to save seven images.

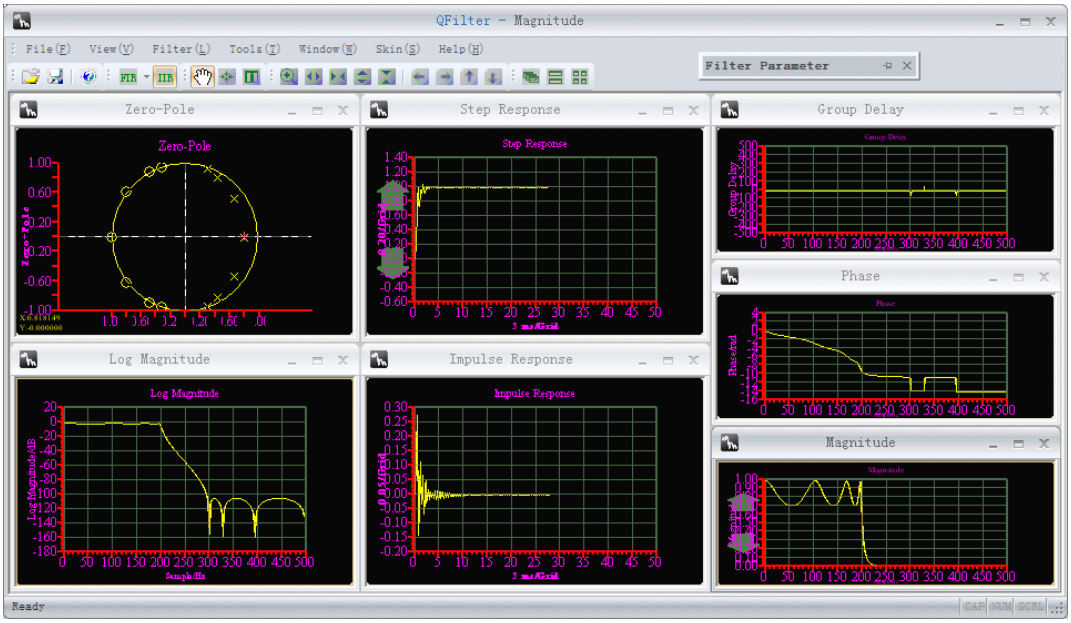

Figure 6.5 IIR 7 order elliptical

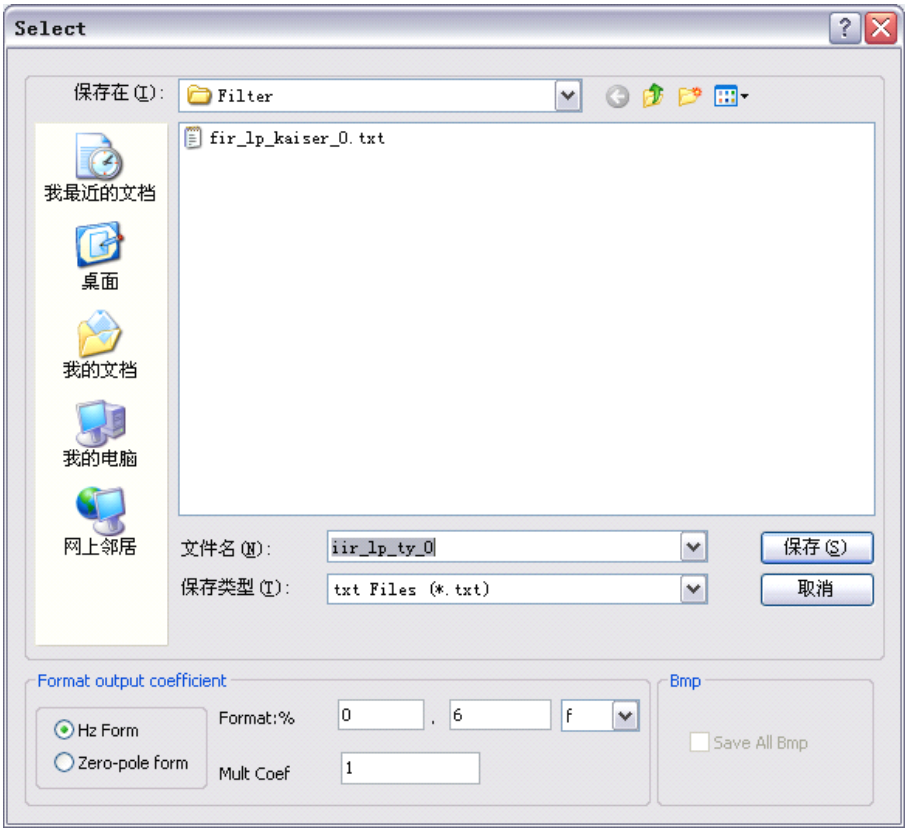

Figure 6.6 save dialog

7. DDS (Only DDSO-100)

As open after the DDS source interface, the waveform is a waveform and frequency of the output set; amplitude and bias need to use the USB port next two knobs to adjust.

Sweep a sweep according to the parameters set output waveform.

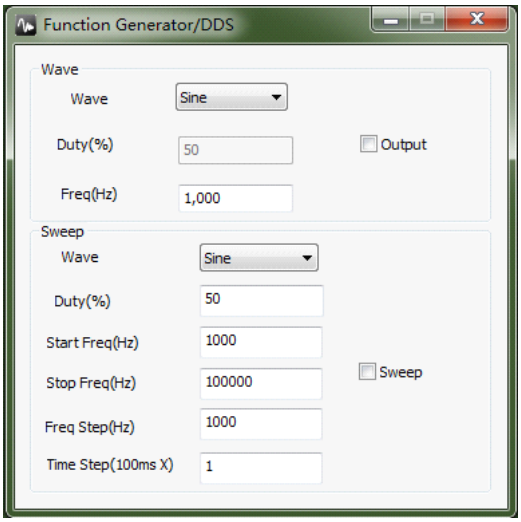

Figure 7.1 DDS